U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Lithobates onca* (formerly in *Rana*)

COMMON NAME: Relict leopard frog

LEAD REGION: Region 8

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status
___ New candidate
X__ Continuing candidate
___ Non-petitioned
X__ Petitioned - Date petition received: May 12, 2002
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

In May 2002, the Service was petitioned to list the relict leopard frog as an endangered species under the Endangered Species Act (Center for Biological Diversity and Southern Utah Wilderness Alliance 2002, pp. i-63). The petition was largely based on the restricted distribution of the known populations and low numbers of individuals of the species.

We believe that listing the relict leopard frog at this time continues to be warranted but precluded. However, the Conservation Agreement and Strategy completed in 2005 continues to improve the status of and ensure persistence of the species. The species may be removed from candidate status when the success criteria have been attained for the management and conservation objectives identified in the Conservation Agreement and Strategy. The term of the Conservation Agreement and Strategy is 10 years. The Relict Leopard Frog Conservation Team develops and oversees annual work plans to implement the measures in the agreement and strategy.

___ Listing priority change
Former LP: ____
New LP: ____

Date when the species first became a Candidate (as currently defined): June 13, 2002

___ Candidate removal: Former LPN: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Amphibian/*Ranidae*

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Nevada, Arizona, and Utah

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Clark County, Nevada and Mohave County, Arizona

LAND OWNERSHIP: All known extant populations occur on lands within Lake Mead National Recreation Area (LMNRA), administered by the National Park Service (NPS) and land administered by the Bureau of Land Management (BLM). One site where the species is believed to be extirpated occurs on private lands in Littlefield, Arizona.

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BIOLOGICAL INFORMATION:

Species Description

The relict leopard frog (*Lithobates onca*) (formerly in *Rana*) is a medium-sized frog (4.45-8.9 centimeters [1.75-3.5 inches] in length) in the family Ranidae (true frogs). Generally, the relict leopard frog is brown to grey above with greenish brown spots that are often reduced or obscure on the front of the body. The colors underneath are white to yellow with occasional grey or brown mottling. The dorsolateral folds are indistinct and end well before the groin. A light line runs from below the eye, under the tympanum, to behind the angle of the mouth (Stebbins 2003, p. 238).

Photo courtesy National Park Service

Taxonomy

The taxonomy of relict leopard frogs has a controversial history centered around two major uncertainties. One long-debated uncertainty is whether or not relict leopard frogs and Vegas Valley leopard frogs (*R. fisheri*) represent distinct species or a taxonomic synonymy (Jaeger *et al*. 2001, p. 339). The latter taxon was described from a series of specimens collected in the Las Vegas Valley, Clark County, Nevada (Stejneger 1893, pp. 227-228). The other uncertainty is whether or not extant populations of leopard frogs within the Virgin River drainage, in the general range of relict leopard frogs, represent disjunct populations of lowland leopard frogs (*R. yavapaiensis*), a species described in 1984 (Platz and Frost 1984, pp. 940-941). Both of these historical uncertainties raised questions about the evolutionary distinctiveness of remnant populations within the Virgin River drainage and adjacent areas.

In a phylogenetic analysis, Jaeger *et al*. (2001, p. 339) investigated evolutionary distinctiveness of leopard frog populations within the Virgin River drainage and adjacent areas relative to lowland leopard frogs from the main distribution of that taxon. Results showed that leopard frogs from the Virgin River south into Black Canyon of the Colorado River were genetically very similar, and that this group of populations was genetically distinct from lowland leopard frogs. Analysis of morphological characters of leopard frogs from the Virgin River and lowland leopard frogs from the primary range of that taxon showed that these two groups exhibit very similar appearances but represent opposite ends of a multivariate continuum. The type specimen of the relict leopard frog was very similar to samples collected from extant populations within the Virgin River drainage. Based on these results, Jaeger *et al*. (2001, p. 339) concluded that populations from the Virgin River and Black Canyon area are relict leopard frogs.

The systematic relationship between the relict leopard frog and the Vegas Valley leopard frog remains unresolved. Historically, there were few actual comparisons between these taxa and the few comparisons suffered from a lack of relict leopard frog specimens. An unpublished study of morphological characters of preserved specimens compared historical samples from the Las Vegas Valley (i.e., Vegas Valley leopard frogs) to those along the Virgin River (i.e., relict leopard frogs) as well as other southwestern leopard frog taxa (Jennings *et al*. 1995, pp. 1-4). This study showed substantial morphological differences between leopard frogs from the Las Vegas Valley and all of the other leopard frog taxa examined, including those from the Virgin River drainage. Eighteen morphological characters were analyzed to better understand the relationships among the traits. These characters included head width and length, lip height, internarial distance, tympanum diameter, spots, bars, and mottling. The entire historical range of the Vegas Valley leopard frog has been lost to urban development and no suitable habitat remains; therefore, it is presumed to be extinct.

Jaeger *et al*. (2001, p. 339), based on molecular, genetic, and morphological evidence, concluded that the relict leopard frog is an evolutionarily significant unit (Moritz 1994, pp. 373-374) distinct from what appears to be a closely related taxon, the lowland leopard frog. Under many species concepts, the differences between relict leopard frogs and lowland leopard frogs are sufficient to distinguish them as separate species. The most up-to-date taxonomic information has been carefully reviewed to reach the conclusion that the relict leopard frog is a valid taxon.

Rana onca was recently removed from the large and predominantly Eurasian genus *Rana* by Frost *et al*. (2006, p. 369) and placed in the genus *Lithobates*, which was accepted in 2008 by the Committee on Standard and Scientific Names (Crother 2008, p. 7).

Habitat and Life History

Being habitat generalists, relict leopard frogs historically probably occupied a variety of habitats including springs, streams, and wetlands characterized by clean, clear water, both deep and shallow, and cover such as submerged, emergent, and perimeter vegetation. Leopard frogs generally require shallow water with emergent vegetation for foraging and basking, and deeper water, root masses, undercut banks, and debris piles for cover and hibernacula (Relict Leopard

Frog Conservation Team 2005, p. 23). Emergent or submergent vegetation provides cover and oviposition (egg-deposition) substrate (Relict Leopard Frog Conservation Team 2005, p. 27). A typical egg mass contains several hundred eggs. Observations suggest that adults prefer relatively open shorelines where dense vegetation does not dominate (Bradford *et al*. 2005, p. 568). Relict leopard frogs reach sexual maturity in 1-2 years. Longevity data are limited for the relict leopard frog but the northern leopard frog (*L. pipiens*) is known to live at least 4-5 years.

Historical Range/Distribution

Based on museum specimens, historical surveys and collections, field studies and observations and literature, the known historical distribution for relict leopard frog is springs, streams, and wetlands within the Virgin River drainage downstream from the vicinity of Hurricane, Utah; along the Muddy River, Nevada; and along the Colorado River from its confluence with the Virgin River downstream to Black Canyon below Lake Mead, Nevada and Arizona. All historical localities are at or within a few kilometers of these rivers. This apparent restriction in proximity to the main rivers, however, may be partially an artifact of historical collecting activities. Speculatively, the relict leopard frog may have also occurred at lowland localities along the Colorado River upstream from the confluence with the Virgin River, but no known specimens exist from this area (Relict Leopard Frog Conservation Team 2005, p. 22).

The species was considered extinct since the 1950's, until it was rediscovered in 1991 at seven sites in three relatively small areas: (1) near the Overton Arm of Lake Mead, Nevada; (2) Black Canyon near the Colorado River below Hoover Dam, in Nevada; and (3) near Littlefield, Arizona. Both Nevada areas represent historical localities, with specimen records dating from 1936 at the Overton Arm area and from 1955 at Black Canyon.

Current Range/Distribution

Relict leopard frogs are currently known to occur only in seven natural and eight translocated sites within two general areas in Nevada: near the Overton Arm area of Lake Mead, and Black Canyon below Lake Mead. These two areas, encompassing maximum linear extents of only 3.6 and 5.1 kilometers (km) (2.2 and 3.2 miles [mi]), respectively, comprise a small fraction of the historical distribution of the species. Relict leopard frog populations may occur in other localized areas within its historical range where habitat conditions are suitable. At present, the species occurs on lands within the LMNRA administered by the NPS and translocations sites managed by the BLM. The current range of the relict leopard frog is much reduced (J. Jaeger, University of Nevada, Las Vegas, pers. comm. 2004). We estimate that the relict leopard frog currently occupies approximately 10-20 percent of its estimated historical distribution (Figure 1).

Portions of relict leopard frog egg masses taken from natural populations are maintained in a two captive rearing facilities. NPS maintains a captive rearing facility in Boulder City, Nevada. The U.S. Fish and Wildlife Service's Willow Beach Fish Hatchery, Arizona serves as a second facility. The captive rearing facilities produce relict larval or froglet stage frogs from the eggs brought from natural wild egg masses for translocation.

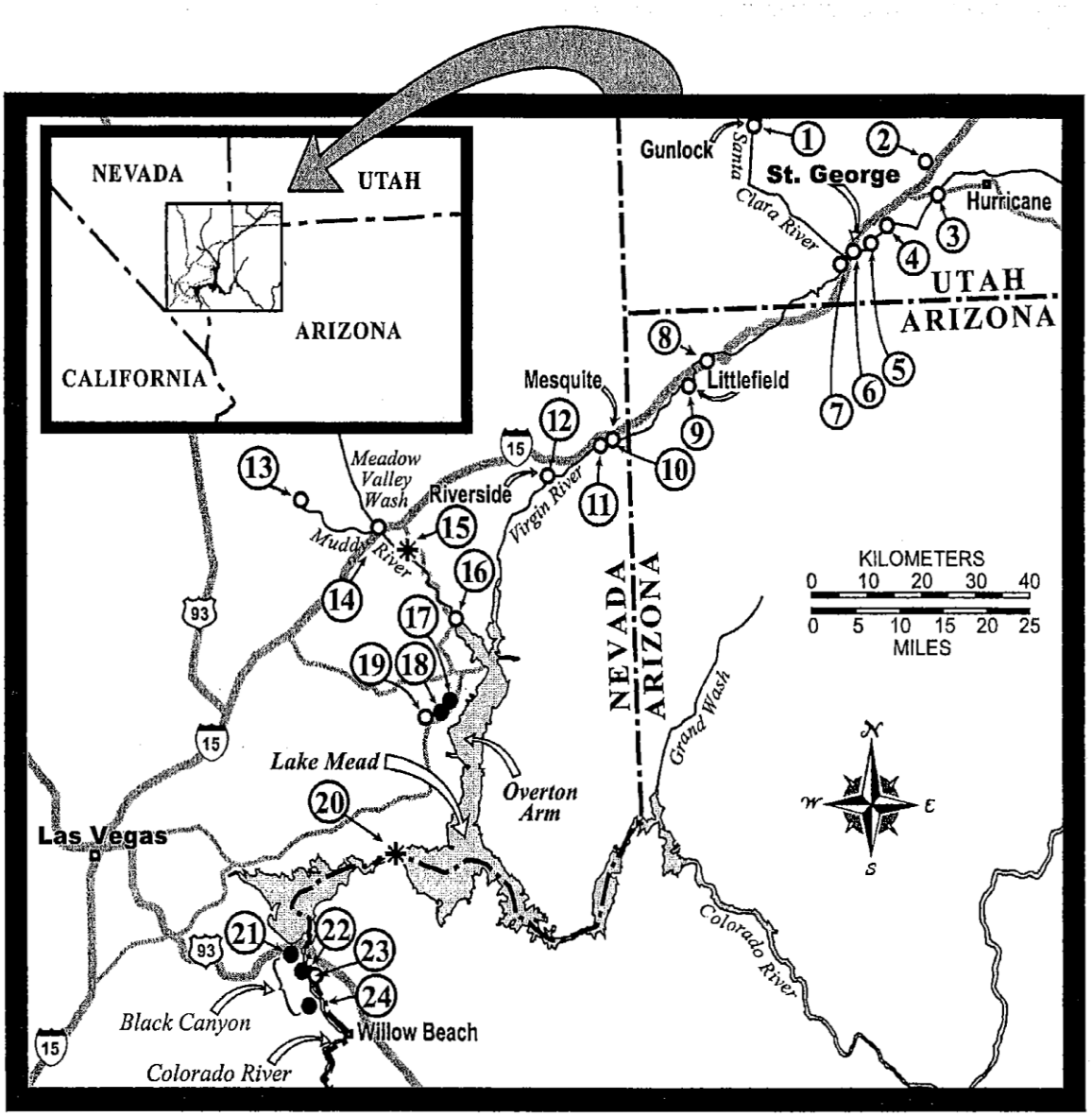

FIG. 1—Locality records (≥1.0 km apart) for *Rana onca*. Symbols indicate locations of extant populations (solid circles, $n = 5$), historical (pre-1970) localities based on verified museum specimens where the species no longer occurs (open circles, $n = 17$), and historical localities based on literature (locality 20) or a missing specimen (locality 15) where the species no longer occurs (asterisks, $n = 2$). All symbols represent historical localities except for 3 sites in Black Canyon with extant populations (localities 21, 22, 24).

Figure 1: taken from Bradford *et al.* 2004.

Recent survey efforts/information:

Sixty-four localities were searched following rediscovery of the relict leopard frog; 12 of which were known historical localities. Some other historical localities were not searched because either suitable habitat is no longer present or the site could not be reliably located. Leopard frogs were found at only seven sites (Bradford *et al*. 2004, p. 218), two of which subsequently are believed to have been extirpated (Littlefield, Arizona and Corral Spring, near the Overton Arm of Lake Mead, Nevada). All seven localities were either historical localities (Littlefield; Blue Point, Rogers, and Corral Springs) or within a few kilometers of historical localities (Boy Scout, Salt Cedar Spring, and Bighorn Sheep Springs). In addition, two leopard frogs have been observed on different occasions in 2000 and 2001 at the fish hatchery at Willow Beach located 10 km (6 mi) downstream from Bighorn Sheep Spring in Black Canyon (C. Fiegel, pers. comm. 2000). One of these frogs was collected and confirmed as *R. onca* based on mitochondrial DNA sequence similarity (C. Fiegel, pers. comm. 2001). This individual was likely swept downstream from the occupied sites in Nevada. In comparison, the current distribution of the relict leopard frog is markedly less than the historic distribution.

a. 2009 Monitoring Results for Natural Populations

Black Canyon:

- Bighorn Sheep Spring (Nevada): Egg masses (21), tadpoles (1,200+), and adults (35).
- Boy Scout Spring (Nevada): Egg masses (5), tadpoles (175), juvenile (1), and adults (70).
- Dawn's Canyon Spring (Nevada): Egg mass (1); tadpoles (6), juveniles (4), and adults (7).
- Salt Cedar Spring (Nevada): Egg masses (2), tadpoles (475), juveniles (68), and adults (192).
- Black Canyon Spring (Nevada): Egg mass (1), tadpoles (3), and adults (27).

Overton Arm:

- Blue Point Spring (Nevada): Adults (38).
- Rogers Spring (Nevada): Adult (1).

b. 2009 Monitoring Results for Translocation Sites

- Goldstrike Canyon (Nevada): Egg masses (3), tadpoles (72), and adults (36).
- Grapevine Spring -Meadview (Arizona): Egg masses (9), tadpoles (24), juveniles (10), and adults (331).
- Pupfish Refuge Spring (Nevada): Tadpoles (300+), juvenile (1), and adults (66).
- Quail Spring (Nevada): Tadpoles (40) and adults (113).
- Red Rock Spring (Nevada): Egg masses (7), juveniles (4), and adults (36).
- Tassi Spring (Arizona): Egg masses (10), tadpoles (43), and adults (327).

In 2009, a total of 848 tadpoles and 438 frogs were released at Goldstrike (143 tadpoles), Grapevine Spring- Meadview (705 tadpoles), Quail Spring (115 frogs), Red Rock Spring (100 frogs), and Tassi Spring (223 frogs).

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Connectivity among the six natural extant populations has been dramatically reduced as a result of damming the Colorado River. The formation of Lake Mead in 1935 apparently eliminated at least one population located between the Overton Arm and Black Canyon areas (Cowles and Bogert 1936, pp. 33-34), and presumably eliminated any potential for dispersal of frogs between these two areas. In Black Canyon, the control of river flow for power management since 1935 and the formation of Lake Mohave in 1951 presumably have dramatically impeded dispersal among Black Canyon sites, which are separated from each other by 1.8-5.0 km (1.1-3.1 mi) via the Colorado River. The loss of connectivity is a result of a wider waterbody created when the Colorado River was dammed, thus preventing frog movements from moving from one side of the river to the other. Here, Lake Mohave influences the river level such that the canyon floor is never exposed, predatory game fishes are present in the river, and water is continually cool because it emerges from the bottom of Lake Mead. Nevertheless, downstream movement appears possible as suggested by the observations of individual relict leopard frogs at Willow Beach, 10 km (6 mi) downstream from the nearest known population (C. Fiegel, Willow Beach National Fish Hatchery, Service, pers. comm. 2004).

The causes for the population declines of this species are not entirely clear, but suggested factors include alteration of aquatic habitat due to agriculture and water development, and the introduction of exotic predators and competitors (Jennings 1988, pp. 1-2; Jennings and Hayes 1994, p. 199). The formation of Lake Mead in 1935 and Lake Mohave in 1951 inundated over 97 river km (60 river mi) and adjacent associated scattered wetlands.

Within the Overton Arm area, dispersal of relict leopard frogs may be possible between Blue Point and Rogers Springs, which are separated by a minimum of 1.6 km (1 mi). The NPS observed two relict leopard frogs at a small spring located between Blue Point and Rogers Springs (R. Haley, NPS, pers. comm. 2004). Wetland habitat has been converted to agriculture or urban development near the Virgin and Muddy Rivers in Utah, Arizona, and Nevada. Also, along the Virgin River, the hydrological regime has been substantially changed by upstream impoundments, diversions, and ground water pumping.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

No known threats.

C. Disease or predation.

Little is known of pathogens and parasites of relict leopard frogs. Two important amphibian pathogens, chytrid fungus and viruses, have been the focus of recent research. Twenty seven adult and sub-adult lowland leopard frogs, two larval lowland leopard frogs, two adult Chirichahua leopard frogs (*L. chiricahuensis*), and two adult canyon tree frogs (*Hyla arenicolor*)

collected from eight Arizona sites experiencing mortality events were found to have characteristic lesions of chytrid fungus infection (Bradley, *et al*. 2002, p. 206). All fungus outbreaks in Arizona have been cool season phenomena. Presently, chytrid fungus has not been confirmed as a pathogen of relict leopard frogs; however, there are likely to be immune to this pathogen.

Exotic species, which are often implicated as serious predators and competitors of native ranid frogs in the western United States have become widely distributed along the Virgin, Muddy, and Colorado Rivers. Included among these are the American bullfrog (*L. catesbeiana*), many species of exotic fishes, and red swamp crayfish (*Procambarus clarkii*) (Jennings and Hayes 1994, p. 199). These species potentially predate all life stages of the relict leopard frog including eggs and larvae. Bullfrogs also negatively affect native amphibians through competition for food and coversites.

D. The inadequacy of existing regulatory mechanisms.

Regulations administered by the Nevada Department of Wildlife (NDOW) afford the relict leopard frog some legal protections. The species is classified as protected under the Nevada Administrative Code (NAC) 503.075, which requires a permit to collect or possess individuals. Habitat protection for the relict leopard frog is provided by NAC 504.520, which prohibits alteration of a wetland or stream to the detriment of wildlife without a permit. Nevada Revised Statutes (NRS) 503.587 allows the Wildlife Commission to use its authority to manage land to carry out a program for conserving, protecting, restoring and propagating selected species of native fish, wildlife and other vertebrates and their habitats, which are threatened with extinction and destruction. Also, NRS 533.367 states that before a person may obtain a right to the use of water from a spring or water that has seeped to the surface of the ground, that person must ensure that wildlife which customarily uses the water will have access to it. However, the State Engineer, who oversees all water rights, may waive this requirement for a domestic use of water.

The Arizona Game and Fish Department (AGFD) also provides some legal protections to the relict leopard frog. The species is classified as Wildlife of Special Concern in the State, and Commission Order 41 of the AGFD regulations prohibits collection or hunting of relict leopard frogs, except under the authority of a special permit. Protection under Commission Order 41 provides protection to individuals, not habitat.

The Utah Division of Wildlife Resources also affords some legal protections to the relict leopard frog. The relict leopard frog is classified as a Sensitive Species in Utah. State of Utah Rule 657-3 prohibits the collection, importation, and possession of relict leopard frogs without a certificate of registration but provides no protection of habitat.

Legal protection is afforded to the relict leopard frog by the NPS at LMNRA under 36 CFR Part 2, which prohibits unauthorized possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state any living or dead wildlife or fish, or the parts or products

thereof. Extant populations of the relict leopard frog on NPS lands are afforded protection under the National Park Service Organic Act (16 USC 1, 2, 3 and 4).

Relict leopard frogs are considered a sensitive species on BLM lands. The BLM requires that potential impacts to such species from proposed land uses and activities be avoided or minimized.

The Lacey Act (16 U.S.C. 3371 *et seq*.), as amended in 1982, provides some protection for the relict leopard frog. This legislation prohibits the import, export, sale, receipt, acquisition, purchase, and engagement in interstate or foreign commerce of any species taken, possessed, or sold in violation of any law, treaty, or regulation of the United States, any Tribal law, or any law or regulation of any State. The relict leopard frog is not protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which regulates international trade.

Adequacy of these laws: State regulations support Federal regulations, which focus on protection of relict leopard frogs (wildlife agencies) and water resources (State Engineers). State law in Nevada, Arizona, and Utah provides limited protection to relict leopard frogs and, to a lesser degree, their habitat. All known extant populations of the relict leopard frog occur within the LMNRA, which is managed by the NPS. As stated above, NPS regulations offer protection to the relict frog and its habitat, though the enforcement of regulations that prohibit transport and release of nonnative predators is difficult at best. The LMNRA receives a high number of visitors each year, which results in a proportionate number of law enforcement issues. Existing law enforcement staff appears to be unsuccessful in preventing the transport and release of nonnative predators at all sites occupied by relict leopard frogs on LMNRA.

E. Other natural or manmade factors affecting its continued existence.

The low numbers of individuals within each population, some of which may not be viable, further threatens the relict leopard frog. Amphibians are thought to have a metapopulation structure consisting of groups of individuals inhabiting a system of habitat patches connected by migration across contiguous habitat. Populations that occur in isolated patches may be extirpated by stochastic events such that recolonization may not occur due to the distance of separation and absence of contiguous habitat (Marsh and Trenham 2001, p. 41).

Bradford *et al.* (2004, p. 224) estimated that 330 adult frogs occur in the Overton Arm area (Blue Point and Rogers Springs) and 747 adult frogs occur in Black Canyon. Mark-recapture efforts were conducted in 2009 only at Blue Point Spring which produced adult population estimates for the site of 91 in spring and 69 in the fall.

The threat of low numbers of individuals is being minimized through collection of eggs from wild and captively-held individuals, and head-starting the tadpoles to metamorphosis. Toadlets from this effort are considered for translocation with the goal of establishing new, self-sustaining populations within the historical range of the species.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

The NPS, in cooperation with various other Federal, State, and local partners, including the Service, developed a Conservation Agreement and Strategy, which is intended to improve the status of the relict leopard frog through prescribed management actions and protection. The Conservation Agreement and Strategy was finalized in 2005 and implementation of conservation actions are proceeding as described therein. The effort to develop the plan began in March 2001 with the formation of a group of biologists and resource managers, now referred to as the Relict Leopard Frog Conservation Team. Conservation actions identified for implementation in the agreement and strategy include captive rearing tadpoles for translocation and refugium populations, habitat and natural history studies, habitat enhancement, population and habitat monitoring, and translocation. Ongoing and future management and conservation activities will proceed under the direction of the Relict Leopard Frog Conservation Team.

The 2009 Work Plan included:

- Maintain frog-rearing facilities at the Willow Beach National Fish Hatchery
- Augment five existing translocation sites (Goldstrike Canyon Spring, Nevada; Grapevine Spring, Arizona; Quail Spring, Nevada; Red Rock Spring, Nevada (east of Overton Arm); and Tassi Spring, Arizona)
- Monitor all translocated and natural populations
- Enhance habitat at existing spring sites
- Complete development of refugium at Perkins Pond in Clark County, Nevada and translocate frogs
- Work with the Nevada Division of State Parks (NDSP) to develop an agreement to establish a refugium at Ash Grove Spring (Spring Mountain Ranch State Park)
- Manage database of natural, transplanted, and potential sites
- Continue implementation of two Clark County Multiple Species Habitat Conservation Plan (MSHCP) proposals:
    - Delineation of distribution, evaluation of relatedness, and assessment of connectivity for relict leopard frog populations
    - Relict leopard frog monitoring and management
- Complete MSHCP project: Evaluation of experimental habitat manipulations on relict leopard frog populations
- Engineer, design, and begin construction of refugium ponds at the Las Vegas Springs Preserve, Las Vegas, Nevada
- Continue to investigate the potential to develop frog habitat at a Southern Nevada Water Authority water pumping station south of Las Vegas
- Work with the NPS Data Management Team to ensure timely distribution of work products to the Conservation Team
- Coordinate on development of Virgin River Habitat Conservation and Recovery Plan to incorporate relict leopard frog conservation priorities
- Continue assessment of chytrid fungus pathogen status in relict leopard frogs

- Complete environmental clearances for Union Pass Spring and Quail Spring to be established as new translocation sites
- Follow up on Stuart Ranch and Pakoon Springs as potential translocation sites
- Maintain communication with U.S. Geological Survey regarding modeling relict leopard frog habitat in the Gold Butte area
- Assess Gold Butte Springs for potential translocation
- Prepare draft programmatic Candidate Conservation Agreement with Assurances (CCAA)
- Follow up with Utah Division of Wildlife Resources regarding their involvement in relict leopard frog conservation activities.
- Update relict leopard frog captive care and release protocols

As of December 2, 2009 (unless noted otherwise), the following activities identified in the 2009 Work Plan were initiated or accomplished:

- All natural and translocation sites occupied by relict leopard frogs were surveyed at least once diurnally and twice nocturnally; frogs were observed at all surveyed sites and egg masses were observed at 11 sites.
- Mark-recapture efforts at Blue Point Spring included six spring and five fall surveys and produced adult population estimates for the site of 91 in spring and 69 in the fall.
- A total of 1,476 tadpoles hatched in the NPS lab from six partial egg masses collected from Black Canyon
- A total of 1,286 frogs or tadpoles were released at translocation sites. No translocations occurred at two sites as last year was the 5th year and per the Conservation Agreement and Strategy, further augmentation will not be conducted over the next several years to assess the success of the translocations.
- As of March 24, 2010, Perkins Pond is ready to receive frogs which is anticipated to occur by the end of April 2010.
- Scrape samples were collected from amphibians at 12 sites during fall nocturnal surveys in an effort to assess for chytrid fungus
- Quail Spring habitat modification was conducted for translocation in coordination with BLM.
- Stewart Ranch, which contains a stream, wetlands, and riparian habitat, was visited to assess potential as a refugium site
- Habitat work and assessment continues at Pakoon Spring. Five ponds are filled with water, outflow channels created and lined with rock. Willow and cottonwood seedlings have been planted and bullfrogs are being removed.
- Environmental clearance for Union Pass Spring continues and is a priority for translocation in 2010.
- A draft CCAA is complete and is under review by the Service.
- The Clark County MSHCP habitat manipulation project is complete; final report submitted to NPS and Clark County; the other two studies continue.
- Las Vegas Springs Preserve in the Las Vegas Valley is moving forward to establish a refugium.

SUMMARY OF THREATS:

The primary threats to the relict leopard frog include loss and fragmentation of habitat through historical water diversions and developments, the presence of nonnative predators and competitors, and low numbers of individuals in metapopulations. Currently, no specific water developments or direct habitat losses are known that could result in impacts to the species, and the numbers of individuals and sites occupied by the frog are increasing through captive-rearing and translocation. At this time, the threats are determined to be moderate to low in magnitude and non-imminent. We find that the relict leopard frog is warranted for listing throughout all of its range, and, therefore, it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

POLICY FOR EVALUATION OF CONSERVATION EFFORTS (PECE):

For species that are being removed from candidate status:
___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES:

We recommend continued implementation of the Conservation Agreement and Strategy, specifically items 1-6 below.

1. Remove or substantially minimize threats to extant populations and occupied habitats.
2. Enhance existing habitat and/or create new habitats where feasible.
3. Establish additional populations of relict leopard frogs in existing or created habitats.
4. Manage relict leopard frogs and their habitats to ensure persistence in diverse aquatic ecosystems, and facilitate processes that promote self-sustaining populations.
5. Monitor relict leopard frog populations.
6. Investigate the conservation biology of the relict leopard frog, and use the results of such investigations to better meet the goal and objectives.

LISTING PRIORITY: 11

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	**11***
		Subspecies/population	12

Rationale for listing priority number

Magnitude: The magnitude of threats to the relict leopard frog is moderate to low based on its numbers and distribution, and presence of nonnative predators. Most populations of the relict leopard frog face one or more threats which may be long-term in duration. However, no populations are currently threatened by disease or any proposed anthropogenic activity that would reduce the numbers and distribution of any given population. All extant populations are partially protected by NPS and BLM resource management regulations. The Service believes that the magnitude of threats to the relict leopard frog is similar to the 2005 level when the Conservation Agreement and Strategy was finalized. Despite implementation of recommended measures including establishment of additional populations within the range of the species, the additional populations have not yet proved to be self-sustaining and the threats to the species have not significantly changed.

Imminence: Threats are not considered imminent at this time. Efforts are underway to improve habitat and increase numbers through captive rearing and translocation. We do not know of any proposed projects that may result in further habitat degradation.

Is Emergency Listing Warranted? No.

The threats to the frog are being monitored by the Relict Leopard Frog Conservation Team, which convenes approximately 2-4 times per year. Protection anticipated from emergency listing would not result in a substantial reduction of the threats to the relict leopard frog during the next 12-24 months. The threats to the species are non-imminent and will continue to be managed and

minimized through implementation of the Conservation Agreement and Strategy. Further, we do not expect substantial losses of frogs from current threats. Conservation actions are underway that minimize the major threats to the species including habitat utilization studies, headstarting and translocation, habitat enhancement, and monitoring of natural and translocated populations.

Rationale for Change in Listing Priority Number (insert if appropriate):

N/A

___ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted? No

DESCRIPTION OF MONITORING:

Professional amphibian biologists and resource specialists representing academia, and land and resource management agencies that comprise the Relict Leopard Frog Conservation Team monitor the status of the species and conservation efforts. The team meets in Boulder City, Nevada a minimum of twice per year. Since the last status review in March 2009, the Relict Leopard Frog Conservation Team met twice (April and December 2009). Literature in unpublished reports, herpetological journals, peer-reviewed publications, and information in a petition to list the relict leopard frog as an endangered species (Center for Biological Diversity and Southern Utah Wilderness Alliance 2002, pp. 1-63) form the knowledge base for the relict leopard frog. Active monitoring of natural and translocated populations continues and involves at least three visits to each known site occupied by relict leopard frogs. Amphibian biologists most familiar with ranids in the southwestern U.S. believe this level of monitoring is appropriate given the biology of the species and threats. Monitoring is developed to determine and document population viability, for evaluation and documentation of population trends, and for assessing the success or failure of management activities. Extant populations are monitored following schedules and protocols identified in the Conservation Agreement and Strategy.

COORDINATION WITH STATES:

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Nevada, Arizona, and Utah comprise the extent of all historical and current relict leopard frog populations (natural and introduced). As participating representatives on the Relict Leopard Frog Conservation Team, biologists from the NDOW and AGFD developed the agreement and strategy during 2004-2005 and annually contribute valuable information on the species. Utah Division of Wildlife Resources continues to support the conservation efforts but has decided to limit their involvement with the team due to funding constraints and other higher priorities.

Indicate which State(s) did not provide any information or comments: None.

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APPROVAL/CONCURRENCE:

Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____
Regional Director, Fish and Wildlife Service Date 6-7-2010

Concur: _____
ACTING
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 6, 2010
Conducted by: Michael Burroughs, Nevada Fish and Wildlife Office, Las Vegas, Nevada

FY2010, R8 CNOR: Relict leopard frog